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EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 05/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

(V)

Office Action Summary

Application No.

09/822,926

Applicant(s)

TSUJIMOTO ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,7-16 and 20-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-16 and 20-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1, 2, 7-16, and 20-29. The claims are newly rejected under 35 U.S.C. 112, second paragraph, as necessitated by amendment. Further, although the claims have been amended, they remain rejected under 35 USC §103 for substantially the reasons of record. Accordingly, this action is made final.

It is noted that the identifier for claim 16 reads “(Previously Presented).” However, the identifier should correctly read “(Currently Amended)” as claim 16 has been amended.

Claim Objections

2. Claim 1 is objected to because of the following informalities: the ranges “ $0.9 \leq x \leq 2.0$ ” and “ $0.01 \leq y \leq 0.50$ ” in line 10 contain typographical errors. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 2, 7-16, and 20-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 and 16 have been amended to recite “wherein cobalt

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(Co) is contained in not more than one of the manganese combined complex oxide and the nickel-contained complex oxide.” However, cobalt is not actively recited as being part of the Markush groups which list the elements that each oxide may contain. As such, the Markush groups exclude cobalt from being present in the compounds. However, the amendatory language allows for the possibility of cobalt being present in one of the compounds and is therefore inconsistent with the Markush groups. To obviate this rejection, it is suggested that cobalt simply be added back into the Markush groups. The claims will be interpreted in such a manner herein.

Claim Rejections - 35 USC § 103

5. Claims 1, 2, 8-12, 14, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/59214 in view of Takeuchi et al (U.S. Patent 6,030,726).

Regarding claim 1, the WO '214 reference is directed to a nonaqueous electrolyte secondary battery (see page 1, lines 1-6). The positive electrode contains a complex oxide of manganese, lithium, and cobalt, and a complex oxide of nickel, lithium, and cobalt (see page 15, lines 23-25). The oxides have the formulas $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ ($0 < y < 0.6$) and $\text{LiNi}_x\text{Co}_{1-x}\text{O}_2$ ($0 < x < 1$), respectively (see page 15, lines 23-25). Regarding claim 2, the manganese oxide may be present in an amount of 20-98% by weight of the total electrode structure, and the nickel oxide may be present in an amount of 1-79% (see page 15, lines 23-25). Regarding claims 8-10, the negative electrode contains a material capable of occluding and releasing lithium (e.g., graphite, coke, or carbon black; see page 15, lines 18-20). Regarding claims 9, 11, and 12, the

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negative electrode may also contain an alloy of lithium and a Group 4B element such as Sn or Si (see page 15, line 20; page 3, lines 6-19). Regarding claims 14, and 28, the electrolyte contains a salt and a solvent such as ethylene carbonate, propylene carbonate, or diethyl carbonate (see page 16, lines 18-23).

The WO '214 reference does not expressly teach that not more than one of the complex oxides contains cobalt, as recited in claim 1.

Takeuchi et al. is directed to a lithium secondary battery. In column 7, lines 15-28, the reference teaches a positive active material comprising $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ where M can be Al, Sn, Cr, Mg, or Co.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the Al, Sn, Cr, or Mg-containing $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ compound of Takeuchi et al. as the $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ compound of WO '214. In column 7, line 15, Takeuchi et al. teach that "[a]s an active material for the positive electrode, a cheap Mn compound having a stable crystalline structure is used." Accordingly, this would provide motivation to use the $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ compound of Takeuchi et al. as the $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ compound of WO '214. Furthermore, the disclosure of Takeuchi et al. also shows that Al, Sn, Cr, and Mg are equivalent to Co when used in the $\text{Li}_x\text{Mn}_{2-y}\text{M}_y\text{O}_{4-z}$ compound. Such substitution of equivalents has been held to be obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

6. Claims 7, 13, 15, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/59214 in view of Takeuchi et al. as applied to claims 1, 2, 8-12, 14, and 28 above, and further in view of Fujimoto et al (U.S. Patent 5,683,834)

The WO '214 reference does not expressly teach not teach that the cell is spirally wound through a microporous separator and that the electrode layers are coated on both sides of their respective current collectors (claims 7, 13, and 27), or that the electrolyte is solid or gelled (claims 15 and 29).

The patent of Fujimoto et al. is directed to a spirally-wound nonaqueous cell. The separator/electrolyte element may be comprised of a microporous separator, a gelling polymer containing the electrolytic solution, or an inorganic solid electrolyte (see col. 14, line 42 et seq.). Both sides of each current collector are coated with the respective active material (see abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to incorporate the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214. In the abstract, Fujimoto et al. teach that "the battery is excellent in charge and discharge cycle characteristics, and the sheet electrodes have excellent winding properties when rolled up into cylinders." Accordingly, the artisan would be motivated the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214.

Additionally, the artisan would be motivated to incorporate any of the electrolyte/separator configurations of Fujimoto et al. into the battery of WO '214. Fujimoto et al. describe these configurations as "suitable" for use in the battery. Accordingly, the artisan would be motivated to use one of these configurations in the battery of WO '214.

7. Claims 16 and 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/59214 in view of Yamashita et al (U.S. Patent 6,255,020) in view of Fujimoto et al.

Regarding claim 16, the WO '214 reference is directed to a nonaqueous electrolyte secondary battery (see page 1, lines 1-6). The positive electrode contains a complex oxide of manganese, lithium, and cobalt, and a complex oxide of nickel, lithium, and cobalt (see page 15, lines 23-25). The oxides have the formulas $\text{Li}_x\text{Co}_y\text{Mn}_{2-y}\text{O}_4$ ($0 < y < 0.6$) and $\text{LiNi}_x\text{Co}_{1-x}\text{O}_2$ ($0 < x < 1$), respectively (see page 15, lines 23-25). Regarding claim 20, the manganese oxide may be present in an amount of 20-98% by weight of the total electrode structure, and the nickel oxide may be present in an amount of 1-79% (see page 15, lines 23-25). Regarding claims 22-24, the negative electrode contains a material capable of occluding and releasing lithium (e.g., graphite, coke, or carbon black; see page 15, lines 18-20). Regarding claims 23, 25, and 26, the negative electrode may also contain an alloy of lithium and a Group 4B element such as Sn or Si (see page 15, line 20; page 3, lines 6-19).

The WO '214 reference does not expressly teach that not more than one of the complex oxides contains cobalt, as recited in claim 16. The reference further does not expressly teach that the mean particle size of the positive active material is 30 microns or below, as recited in claim 16, or that the electrode layers are coated on both sides of their respective current collectors (claim 21).

Yamashita et al. is directed to a lithium secondary battery. In column 8, lines 47-53, the reference teaches a positive active material comprising $\text{LiNi}_{1-x}\text{A}_x\text{O}_2$ where A can be Fe, Al, Cr, Mg, or Co.

The disclosure of Yamashita et al. indicates that Fe, Al, Cr, and Mg are equivalent to Co when used in an $\text{LiNi}_{1-x}\text{A}_x\text{O}_2$ compound of a positive electrode. Therefore, it would be obvious to substitute the Fe, Al, Cr, or Mg-containing compound of Yamashita et al. for the Co-containing compound of WO '214. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

Additionally, the patent of Fujimoto et al. is directed to a spirally-wound nonaqueous cell. Both sides of each current collector are coated with the respective active material (see abstract). The positive electrode active material (e.g., a nickel or manganese lithium oxide) preferably has an average particle size of from 0.1 to 50 microns (see col. 11, lines 52-55 and col. 12, lines 15-17).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to incorporate the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214. In the abstract, Fujimoto et al. teach that "the battery is excellent in charge and discharge cycle characteristics, and the sheet electrodes have excellent winding properties when rolled up into cylinders." Accordingly, the artisan would be motivated the double-sided, spirally-wound electrode configuration of Fujimoto et al. into the battery of WO '214.

Additionally, regarding the mean particle size range of 30 microns and below recited in claim 1, Fujimoto's disclosure of 0.1-50 microns is considered to render this limitation obvious. The disclosure of Fujimoto et al. sufficiently guides the artisan to use a particle size of 30 microns or less. Furthermore, it is known that a smaller particle size results in increased

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electrochemical activity. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Response to Arguments

8. Applicant's arguments filed March 4, 2004 have been fully considered but they are not persuasive insofar as they are applicable to the present rejections. Applicants state that "the WO 99/59214 reference does not disclose a compound wherein cobalt is contained in not more than one of a manganese contained complex oxide and a nickel contained complex oxide. Additionally, while Takeuchi et al. describes a lithium secondary battery, Takeuchi et al. does not teach or even suggest a compound wherein cobalt is contained in not more than one of a manganese contained complex oxide and a nickel contained complex oxide." While the Examiner generally concurs with these assertions, they do not address the Examiner's stated reasons for combining the references. Furthermore, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). As such, the rejections of the claims under 35 USC §103 are maintained herein.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Patent Examiner
Art Unit 1746
May 20, 2004